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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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BURNS, DOANE, SWECKER & MATHIS, L.L.P.

P.O. Box 1404

Alexandria, VA 22313-1404

EXAMINER

COMPTON, ERIC B

ART UNIT

PAPER NUMBER

3726

DATE MAILED: 04/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/616,986

Applicant(s)

KOBAYASHI ET AL.

Examiner

Eric B. Compton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-19 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 15-19 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 15-16 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of U.S. Pat. 2,147,343 to Hokanson

AAPA, as found on pages 1-2 of the specification, discloses a conventional wave gear device comprising a main gear; and a tooth forming ring disposed inside the main gear body and having internal teeth formed on an inner circumferential surface thereof. A joint is formed between the main gear and the tooth-forming ring by attaching bolts or the like to a flange, which resulted in increased weight of the device.

However, AAPA does not disclose knurling a surface of the tooth forming ring and press fitting the tooth forming ring and main body together to join the two members.

Hokanson discloses a method for forming friction joint, including joining two different types of materials. Figure 8, especially, shows adding knurls to an outer circumferential surface including at least one cutting edge that extends in a circumferential direction. As noted with respect to Figure 10, "very small tooth-like serrations formed on the harder male portion 17 of the joint, and the effect of same when forced, in the direction of the arrow, into a female member 18 of softer material,

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wherein it is apparent that, though relatively quite small, a considerable portion of the softer material is force into the space intermediate the tooth portions, and which material would have to be dislodged or sheared off if the parts were separated by straight longitudinal force. The slope of the two surfaces formed the V-shape of the tooth-like serrations may be referred to as the rake and clearance angles of the serrations." Figure 9, shows an alternative embodiment in which the protrusion (12) may be placed on an individual basis as well. The reference covers numerous configurations which all connect the two members by essentially the same manner claimed by Applicant.

Regarding claim 15, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the wave gear device of AAPA by knurling a surface of the tooth forming ring and press fitting the tooth forming ring and main body together to join the two members, in light of the teachings of Hokanson, in order to form a joint between a harder and a softer material.

Regarding claim 16, AAPA discloses that in the conventional wave gear device the tooth forming ring is made of a high strength of abrasion resistance material, e.g., steel or copper material and that the main body is made of a lightweight material, e.g., aluminum alloy, particularly suited for its intended use. Specification, page 3, lines 12-19.

Regarding claim 18, the product thus formed by the process of AAPA/Hokanson is inherently disclosed as well.

Regarding claim 19, the prior art does not explicitly disclose the dimensions of the knurl pitch or interference even though these variables are inherently provided for by Hokanson. Applicant has not stated these ranges of variable provide any new or unintended results, other than to prevent rotation. Hokanson suggests varying dimensions as needed to suit a particular need. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the knurls having a pitch of 0.5 to 1.6 mm and have set the interference between 0.03 and 0.3 mm, in light of the teaches of Hokanson, to prevent rotation of a particular application as required, e.g., in the case of AAPA, a ring synchronizer. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

3. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA/Hokanson as applied to claim 15 above, and further in view of U.S Pat. 3,501,182 to Buchsbaum.

AAPA/Hokanson disclose the invention cited above. However, they do not disclose forming the internal teeth on the tooth-forming ring after the tooth-forming ring is integrated with the main gear ring.

Buchsbaum discloses a method for securing a bushing (22) into a geared hub (12) by pressfitting. "The hub 12 and the bushing 22 can be machined after they are assembled so that high degrees of precision can be met." Col. 4, lines 47-49. "After assembly of the bushing 2 into the hub 22, there is substantially a unitary structure and

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little possibility that relative positions of the parts will change prior to usage.” Col. 4, lines 61-64. It is noted specifically with respect to an alternative embodiment that “The gear is then hobbled with respect to this uniform bore in a subsequent operation.” Col. 4, lines 71-72.

Regarding claim 17, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the wave gear device of AAPA/Hokanson by forming the internal teeth on the tooth-forming ring after the tooth-forming ring is integrated with the main gear ring, in light of the teachings of Buchsbaum, in order ensure a high degree of precision. Col. 2, lines 42-49.

Response to Arguments

4. Applicant's arguments filed January 12, 2005, have been fully considered but are not found persuasive.

Applicant argues that prior art does not provide proper motivation for “adding knurls to an outer circumferential surface of the tooth-forming ring and carving, from tops of the knurls, at least one cutting edge that extends in a circumferential direction,” as required for claim 15.

Applicant argues with respect to Hokanson, that the knurls he provides are for preventing axial separation. In addition, Applicant argues that Hokanson is non-analogous art.

With respect to the first issues, while the reference as pointed out by Applicant does teach providing knurls to prevent axial separation, it also teaches providing knurls

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to prevent rotation, just like Applicant. See Page 2, Col. 2, line 8-10. The drill is subject to rotary force, i.e., torque. "In Figure 2 the serrations are shown at 5 as being vertically disposed, or parallel with the axis of the rod, and this form, obviously, presents a surface having the *greatest resistance to rotary movement of the parts.*" *Id.* at lines 29-33 (emphasis added). In Figure 4, the knurls are disposed to provided the greatest resistance to longitudinal separation. See *Id.* at lines 40-46. Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971).

In Hokanson, the knurls (5) may be provided on the outer circumferential surface of the inner shaft member, as shown in Figure 1, which generally corresponds to the tooth-forming ring of Applicant. The material of the inner member is of a harder material than the outer member so the knurls plastically deform the outer member. See Page 2, Col. 2, lines 8-10. This is what Applicant also teaches, the inner tooth-forming ring is formed from hard, abrasion-resistant material while the outer main gear ring is formed from a lightweight, i.e., a softer material. See Specification, Page 14. The top of the knurl is provided inherently with a cutting edge that cuts into the corresponding surface, as it is press-fit.

Lastly, in response to applicant's argument that Hokanson is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir.

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1992); see also *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1276 (Fed. Cir. 2004) (“[T]his court has consistently stated that a court or examiner may find a motivation to combine prior art reference in the nature of the problem to be solved. This form of motivation to combine evidence is particularly relevant with simpler mechanical technologies.”) (citations omitted). In this case, the Examiner concedes that Hokanson is not in the field of Applicant’s endeavor. However, the reference is reasonably pertinent to the particular problem with which the applicant was concerned, i.e., preventing relative rotation between rotating joint members. Thus, the reference may be properly relied on in this rejection.

Conclusion

Applicant’s amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B. Compton whose telephone number is (571) 272-4527. The examiner can normally be reached on M-F, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter D. Vo can be reached on (571) 272-4690. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


ERIC COMPTON
PRIMARY EXAMINER

Eric B. Compton
Primary Examiner
Art Unit 3726

ebc